Thirty-First Street Overflow Structure
31st Street
Denver County
Denver
Colorado

HAER-CO-18

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
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HISTORIC AMERICAN ENGINEERING RECORD

THIRTY FIRST ST. OVERFLOW STRUCTURE

HAER CO-18

Date: 1892-1899.

Location: 31st St., Denver County, Denver CO.

Designed by: E. P. Martin, City Engineer.

Owner: City of Denver.

Significance: This overflow structure comprised an important part of the sanitary engineering system built in Denver during the last part of the 19th century.

Historians: F. A. Patterson and Susan Baldwin, 1978.

Transmitted by: Gary Arabak, 1983

Like most pioneer towns, Denver was without an underground sewer system for the first years of its existence. What existed was primarily surface drainage. It wasn't until 1873 that discussion for a general sewer system began. This went on for almost three years before the need for such a facility was accepted. H. C. Lowrie, City Engineer, planned the first system and oversaw much of its construction, but the rapid growth of Denver soon made it obsolete (Smiley, 1901, pp. 647-648). New systems had to be installed, and the original system greatly amplified.

The key to any such general system was the outlet sewer. This line would have to be large enough to carry all of the sewage from the entire system. In addition, there would have to be provisions for handling storm water run-off as well. It is that reason that led to the construction of the Delgany Street Public Sanitary Sewer.

Built in 1892, the Delgany Street sewer began at the corner of 11th Street and Stout, and was laid along 11th Street to Delgany Street and then followed Delgany to the intersection of 26th Street and the South Platte River (News, April 16, 1894, p. 8). From that point a temporary wooden flume, four feet square, carried the flow to just below the intersection of 31st Street with the South Platte River, where it emptied into the river. This part of the Delgany was completed in late 1892 at a cost of $159,325.60 (Denver, 1891-92).

Throughout most of the nineteenth century, sewage disposal could often be summed as "out of sight, out of mind". Most systems were designed to dump into the nearest waterway, and as far away from the "nice" parts of town as possible. For Denver, this meant dumping all sewage into the South Platte River, which prompted a contemporary historian to remark that this "small and often attenuated stream will presently be unable to move the discharges from the growing city and thus compel the adoption of other methods of sewage disposition. Between demands upon it for irrigation and the burdens imposed by the city sewers, the Platte is destined to soon become a most disreputable waterway" (Smiley, 1901, pp. 647-648). It would be almost forty years after those words were written before something else was done.

As Denver continued to grow, the solution to the increased sewage problem was seen to be to carry it further away from town before dumping in the South Platte River. The Delgany Street sewer extension was designed to carry the flow on downstream from the termination of the original Delgany and dump it into the Platte at about 46th Street. This area was chosen for two reasons. It was felt that the population here was sparse and the stockyards were already polluting the river (Joseph Cox, personal communication). In addition,

the Board of Public Works recognized that some method of sewage treatment would be necessary in the future and that the nearest available site would be in this area (Record, 1899, p. 339).

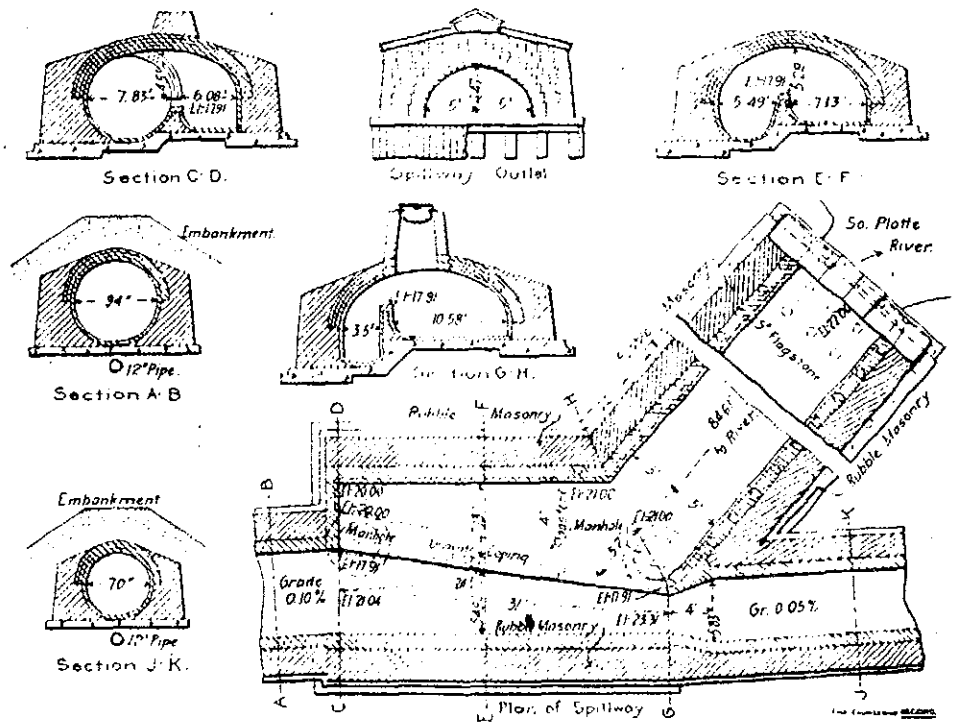
Designed by E. P. Martin, Chief Engineer for the City of Denver, the Delgany sewer extension was to be 8290 feet long. The sewer was to be constructed in a standard manner of three rings of brick set in a rubble cradle resting on a concrete base. The first 2,380 feet, that portion of the line between 26th Street and 31st Street, was to be 94 inches in diameter. Beyond 31st Street, the line would vary in size from 70 to 77 inches all the way to the end of the line.

The Delgany extension is usually referred to as a sanitary sewer, but in fact it was a combined sewer. In addition to receiving sewage from almost all of Denver, it also received storm water from the central business section of the city (Record, 1899, p. 339). The sewer was designed to handle the sanitary flow plus the normal storm run off. However, as was common practice, abnormal amounts of storm water were shunted into the river and out of the sewer. This had the twin benefits of economy and practicality; by removing the storm flow a smaller pipe could be used to carry the sewage to either a treatment plant or farther down river, and a smaller treatment plant could be constructed (Walter Abel, personal communication, Hardenbergh, 1942, pp. 88-89).

The Thirty-first Street overflow structure was placed at that location because of the grade for the sewer beyond that point. Since the Board of Public Works was considering a different method of sewage disposal at a later date, Martin was forced to adopt as flat a grade as possible that would ensure scouring or self cleaning of the sewer and yet take into consideration the elevation of the disposal fields (Record, 1899, p. 339). The overflow structure as it was installed worked as follows:

> The maximum capacity of the 72-inch [sic] main is reached at 93 per cent of its depth, or 5.58 feet, when it is plain that the downstream end of the weir would have an overflow 0.18 feet in depth, and when the flow reaches the top of the 72-inch [sic] main the lower end of the weir would have an overflow 0.60 feet in depth; it is also plain that the depth of overflow gradually increases towards the upstream end at the terminus of the 94-inch main, but that the full capacity of the latter will not yet have been reached when the overflow just touches the top of the 72-inch [sic] main. As a consequence it will be seen that when the 94-inch main is working up to its maximum capacity (93 per cent

of its depth) the 72-inch [sic] main will be working under a very slight pressure, a contingency only very rarely possible in practice. It may be noted that the mouth of the 72-inch [sic] main is considerably choked or contracted laterally, though not vertically (see section G-H), which is for the double purpose of affording a more advantageous position for the overflow weir, and partially choking or retarding the extra velocity imparted to the flow by reason of the short piece of steep invert grade between sections C-D and sections G-H.



STORM-WATER OVERFLOW, DENVER, COLORADO.

(Record, 1899, p. 339)

Martin designed well, and the system could handle unusual stormflow. As he noted,

> It has been my good fortune to see this spillway in practical operation only once, and then not nearly to its full capacity, though the quantity discharged over the weir was quite sufficient to demonstrate the fact that all the parts of the structure are admirably adapted to their respective functions.

(Record, 1899, p. 339)

However, before construction began, a major political controversy with its roots in both state and national politics broke out which had an important impact on the cost of the project.

In 1889, the Colorado Legislature created the Board of Public Works in Denver, one of a number of city boards which the Governor was responsible for filling by appointment. There were two widely divergent views towards these city boards controlled by the state. On the one hand it was felt that the money for physical improvements was kept out of the hands of local politicians while on the other it was argued that the boards were political machines intended to aid the fortunes of the party in state control and especially to assist the personal ambitions of the Governor (Smiley, 1901, p. 636).

Davis Waite was Governor of Colorado from 1893-1895, and was the only Populist Governor in the state's history. Elected during a time of intense economic dislocation, he was a strange mixture of visionary reformer and nineteenth century politician. At the same time he could call for the government paternalism for the business and wealthy to be replaced by "a paternalism for the common people such as our fathers thought they had secured", something which led to his calling out the state militia on the side of the miners in the bitter Cripple Creek strike of 1894. He saw nothing wrong with installing his son Bruce as Deputy Warden of the State Penitentiary, something which required a lengthy battle.

How much of the Governor's unpopularity was due to the impossibility to satisfy everyone with his appointments, and how much due to his response to opposition is unclear. It took a certain amount of flair to call out the state militia to enforce the removal of the Denver Fire and Police Board, an event of March 1894 that did not endear him to Denverites. For reasons like these, his political opponents quickly began calling him ephitets like King Davis the First.

The controversy over the construction of the Delgany sewer extension centered on two points: 1) the wisdom of using day labor versus contract labor, and 2) the need for an ordinance from city council authorizing the work to be done. Compounding the problem further was the Governor's insistence that the workers should be selected by their political affiliations (Eng. News, 1895, pp. 430-31). As a result, the Denver Republican, a political foe of the Governor, quickly began characterizing the project as "illegally constructed for political purposes" (1894, p. 2).

It would be an over-simplification to characterize the controversy as "workers against the bosses", although this was certainly a factor. An equally important point, however, was the increasing demand for homerule. Denver was growing

up and the political leaders felt it should be able to stand on its own. The Governor's reaction to the "City Hall War" had only increased the conviction on the part of a large number of people.

Work finally got underway on August 20, 1894 (News, August 19, 1894, p. 8). A compromise was worked out which permitted the Board of Public Works to do the construction by day labor, the only preference was to be to those men having families. Otherwise no discrimination was made.

The construction at first was slow with only fifty men out of a thousand who wanted to work actually finding it. However, by September 19, the trench for the 94" portion of the line, i.e. the portion between 26th and 31st streets, had been dug, half of the concrete base had been laid, and construction was shortly to start on the rubblestone cradle which was to hold the brick pipes (Republican, September 19, 1894, p. 2).

By the time of the completion of this section of the line, one thing was clear. The Board of Public Works was right in saying that day labor would permit the work to be done cheaper than if the work was done by contract. By March of 1895, city figures showed that in spite of paying the laborers 40% above the normal wages, the first 2,394 feet of line had been laid at a cost of $20.57 per foot. This compared to the cost of $26.82 per foot for the construction of the Delgany sewer, which was done by contract, three years before (Record, 1895, pp. 421-422).

The sewer was completed on June 13, 1895, at a total cost of $148,628.18, and since has continued to serve Denver well. In 1902, a local newspaper was noting that "Our sewer system as far as it goes is perhaps one of the best in the world" (Times, May 18, 1902, p. 7). Unfortunately for some it did not go far enough. Four months later, citizens from Globeville and Elyria, two communities near the outlet of the sewer, petitioned the Board of Public Works to renew their protest and ask that the sewer be extended beyond their towns (Times, September 19, 1902, p. 7).

Nothing was done, although plans were drawn in 1924 for an extension of the Delgany from 46th Street north into Adams County. This extension was never built (Denver, 1924). It was not until 1936-37 that planning began for what is now the Northside Treatment Plant.

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